

WHAT IS CLAIMED IS:

1. An insulation which is resistant to ballistic impact, comprising:
a first layer of high-strength polymeric fabric;
5 a layer of material having a cellular structure disposed upon said first fabric layer; and,
a second layer of high-strength polymeric fabric disposed upon said cellular material.
- 10 2. The insulation of Claim 1, wherein the cellular material is selected from the group consisting of close-celled polymer foams, open-celled polymer foams, open-celled aerogels, and open-celled graphitic foams.
3. The insulation of Claim 2, wherein the layer of cellular material at
15 least partially infiltrates the fabric layers.
4. The insulation of Claim 3, further comprising a matrix of cellular material surrounding said first and second fabric layers.
- 20 5. The insulation of Claim 1, wherein the fabric layers comprise one or more plies of woven polymer fabric.
6. The insulation of Claim 5, wherein the first fabric layer is woven of fibers selected from the group consisting of aramids, polyethylenes, and
25 polybenzazoles, and interwoven combinations thereof.
7. The insulation of Claim 6, wherein the first fabric layer is capable of absorbing up to about 30,000 ft-lbs of kinetic energy without rupture.
- 30 8. The insulation of Claim 5, wherein the second fabric layer is woven of fibers selected from the group consisting of aramids, polyethylenes, and polybenzazoles, and interwoven combinations thereof.

9. The insulation of Claim 8, wherein the second fabric layer is capable of absorbing up to about 30,000 ft-lbs of kinetic energy without rupture.

10. The insulation of Claim 1, further comprising at least one thermal insulation layer wherein the thermal insulation layer comprises a fabric layer having thermal resistance.

11. The insulation of Claim 10, wherein the thermal insulation layer is a glass fabric layer.

12. The insulation of Claim 1, further comprising a radiation control layer formed of a thin film selected from the group consisting of a thin metal film and an aluminized polyester film.

13. The insulation of Claim 1, wherein the relative positioning of the layers and the particular compositions of the ballistic layer and the cellular material is determined by the desired end use of the resulting insulation.

14. The insulation of Claim 1, wherein the insulation is resistant to penetration by a fragment having a kinetic energy greater than about 1700 ft-lbs.

15. The insulation of Claim 14, wherein the insulation is resistant to penetration by a fragment having a kinetic energy greater than about 3500 ft-lbs.

16. An insulated system comprising
a container for retaining at least one fluid; and
an insulation blanket disposed upon at least a portion of said container, said insulation blanket comprising
a first layer of high-strength polymeric fabric;
a layer of material having a cellular structure disposed upon said first fabric layer; and,
a second layer of high-strength polymeric fabric disposed upon said cellular material.

17. The insulated system of Claim 16, wherein the container is selected from the group consisting of a fuel tank, a fuel transfer line, a hydraulic tank, and a hydraulic transfer line.

5 18. The system of Claim 16, wherein the container is a hydrazine fuel tank.

19. The system of Claim 16, wherein the container is incorporated into the fuel system of a vehicle.

10 20. The system of Claim 16, wherein the container is incorporated into the hydraulic system of a vehicle.

21. The system of Claim 16, wherein the insulation is resistant to penetration by a fragment having a kinetic energy greater than about 1700 ft-lbs.

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22. The system of Claim 21, wherein the insulation is resistant to penetration by a fragment having a kinetic energy greater than about 3500 ft-lbs.

23. An insulated hydrazine fuel tank comprising
20 a container for retaining hydrazine fuel; and
an insulation blanket disposed upon at least a portion of said container, said
insulation blanket comprising

a first layer of high-strength polymeric fabric;
a layer of material having a cellular structure disposed upon said first
25 fabric layer; and,
a second layer of high-strength polymeric fabric disposed upon said
cellular material.

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